II. Solution by HENRY HEATON, M. Sc., Atlantic, Ia.; WALTER H. DRANE, Harvard University, Cambridge, Mass.; and G. B. M. ZERR, A. M., Ph. D., Chester High School, Chester, Pa.

$$\int \frac{\sqrt{(-1)}b\,dx}{(x-a)^2+b^2} = -\sqrt{(-1)}\tan^{-1}\frac{b}{x-a} = \tfrac{1}{2}\log\left(\frac{x-a-b\sqrt{(-1)}}{x-a+b\sqrt{(-1)}}\right).$$

$$\therefore \tfrac{1}{2}\log\left(\frac{x-a-b\sqrt{(-1)}}{x-a+b\sqrt{(-1)}}\right) = -\sqrt{(-1)}\tan^{-1}\frac{b}{x-a}.$$

$$\therefore \log[x-a-b\sqrt{(-1)}] - \tfrac{1}{2}\log[(x-a^2)+b^2] = -\sqrt{(-1)}\tan^{-1}[b/(x-a)].$$

$$\therefore \log[x-a-b\sqrt{(-1)}] = \tfrac{1}{2}\log[(x-a)^2+b^2] - \sqrt{(-1)}\tan^{-1}[b/(x-a)].$$

PROBLEMS FOR SOLUTION.

ARITHMETIC.

130. Proposed by H. C. WHITAKER, M.E., Ph.D., Professor of Mathematics, Manual Training School, Philadelphia, Pa.

How many balls 1 inch in diameter can be put in a cubical box 2 feet in the clear each way, putting in the maximum number?

131. Proposed by M. A. GRUBER, A. M., War Department, Washington, D. C.

A right frustum of a cone whose radii of the bases are r and s, $r>s$, is to be divided into n parts of equal volume by sections parallel to the bases. What are the altitudes of the respective parts?

*** Solutions of these problems should be sent to B. F. Finkel not later than June 10.

GEOMETRY.

144. Proposed by L. C. WALKER, Assistant in Mathematics in Leland Stanford, Jr., University, Palo Alto, Cal.

Find the equations of four cones that pass through three given straight lines intersecting in the same point.

145. Proposed by FRANK GRIFFIN, Graduate Student, State University, Boulder, Colo.

If A and B be the points of contact, upon two circles X and Y, of tangents drawn from any point of their circle of similitude, then the tangent from A to Y is equal to the tangent from B to X. [From *Casey's Sequel to Euclid*, Part I., page 114.]

*** Solutions of these problems should be sent to B. F. Finkel not later than June 10.

AVERAGE AND PROBABILITY.

95. Proposed by G. B. M. ZERR, A. M., Ph. D., Professor of Mathematics and Science, Chester High School, Chester, Pa.

Three random points are taken in an ellipse, one on each side of the major axis and the third anywhere in the ellipse. Find the average area of the triangle formed by joining the three points.

96. Proposed by B. F. FINKEL, A. M., M. Sc., Professor of Mathematics and Physics in Drury College, Springfield, Mo.

A random straight line is drawn across a square; find the chance that it intersects two opposite sides. [From *Byerly's Integral Calculus*, page 209].

*** Solutions of these problems should be sent to B. F. Finkel not later than June 10.

MECHANICS.

107. Proposed by M. E. GRABER, Student, Heidelberg University, Tiffin, O.

Two particles attracting each other inversely as the square of their distance apart, are constrained to move in straight lines which intersect each other at right angles. How long will it take for the particles to meet and how far does each particle *move ?*

108. Proposed by F. P. MATZ, M. Sc., Ph. D., Professor of Mathematics and Astronomy in Irving College, Mechanicsburg, Pa.

Can it be shown, as a result of Kepler's third law, that the distances are inversely proportional to the squares of the velocities ?

*** Solutions of these problems should be sent to B. F. Finkel not later than June 10.

BOOKS AND PERIODICALS.

The Teaching of Elementary Mathematics. By David Eugene Smith, Principal of the State Normal School at Brockport, New York. 8vo. Cloth, xv+312 pages. Price, $1.00. New York : The Macmillan Company.

In this book may be found the answer to such questions as these: Whence came the subject of mathematics ? Why am I teaching it ? How has it been taught ? What should I read to prepare for my work ? Any book which answers these questions to the entire satisfaction of the teacher and the student is worthy of a high place in the category of educational works. One will find in this work an excellent treatment of the various methods of teaching arithmetic, algebra, and geometry, and in this respect it is of inestimable value to all teachers of elementary mathematics.

Not only is this book of great value to teachers of mathematics, but to all those who have under their direction the formulation of courses of study. It is to be hoped that this work will help to dispel that insane notion yet quite prevalent even among professed educators that mathematics has only utilitarian value, that only so much of it ought to be studied as will be used in the general affiairs of life. Yet these very same educators see no incongruity in spending five or six years in the study of Greek, or Sanskrit, or Hebrew, or Archeology, even though the student expected to study medicine. It is admitted that a large part of practical arithmetic is not generally applicable to ordinary business, and hence is quite impractical, yet it by no means follows that it may not serve a valuable purpose. "Hamlet may bring us neither food nor clothing, and yet a knowledge of Shakespeare is valuable to every one. It is a matter of no moment in the business affiairs of most men that they know where the Caucasus Mountains are, or which way the Rhine flows, or who Cromwell was, and yet we cannot afford to be ignorant of these facts." This is the proper view. Mathematics should be studied and cultivated for its own sake; for the culture and discipline it gives the mind; for the ethical effect its study produces on the mind of man. Since mathematics is becoming more and more the means by which the